WATER POVERTY IN ENGLAND AND WALES

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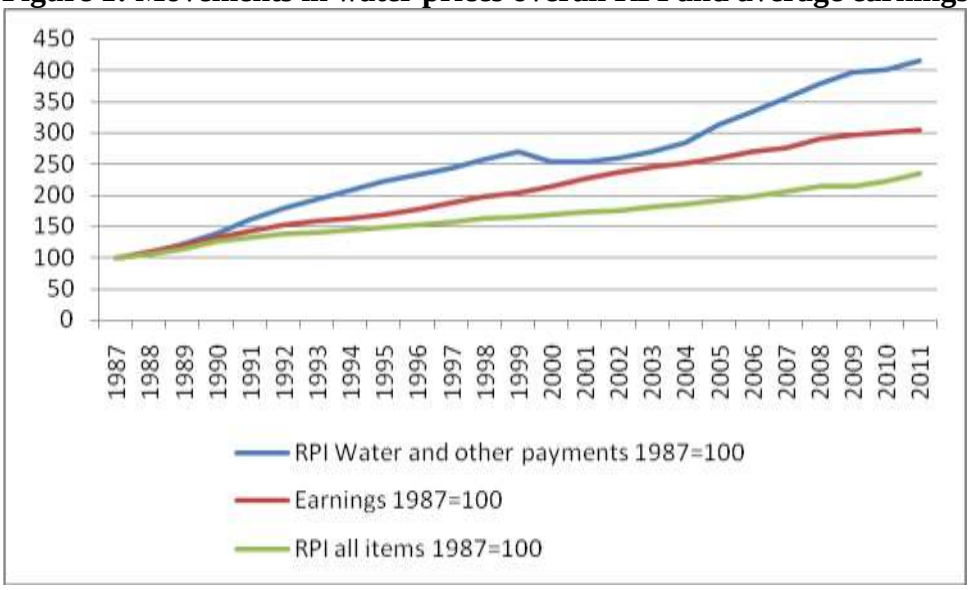
Water poverty is conventionally defined as households spending more than 3% and 5% of their net income after housing costs on water. Water bills have risen faster than general prices and faster than earnings since privatisation. In 2009/10 23.6% of households paying for water in England and Wales were spending more than 3% of their income on water and sewerage and 11.5% were spending more than 5% of their income. The article explores variation in water poverty and prospects for the future. If water bills rise 1% per year faster than household income, water poverty will increase to 35% by 2033 based on a 3% definition. Policy options are discussed.

Introduction

It can be seen in Figure 1 that since privatisation in 1989 water prices have risen faster that overall prices and earnings, increasing more than fourfold by 2011. Water prices have increased by an average of 1.5% per year faster than earnings.

Figure 1: Movements in water prices overall RPI and average earnings 1987=100



Everyone uses clean water and the population of England and Wales is projected to increase by 17% from 2008 to 2033, increasing potential demand. At the same time the cost of maintaining a steady supply of clean water is likely to rise in the context of climate change and extreme weather events, an ageing infrastructure and habits of water use (Figure 2). Firms' costs may also increase as a result of investments in water and sewage treatment to comply with the European Water Framework Directive. And higher costs are likely to mean even higher prices.

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Figure 2: Factors increasing the costs of water treatment and supply

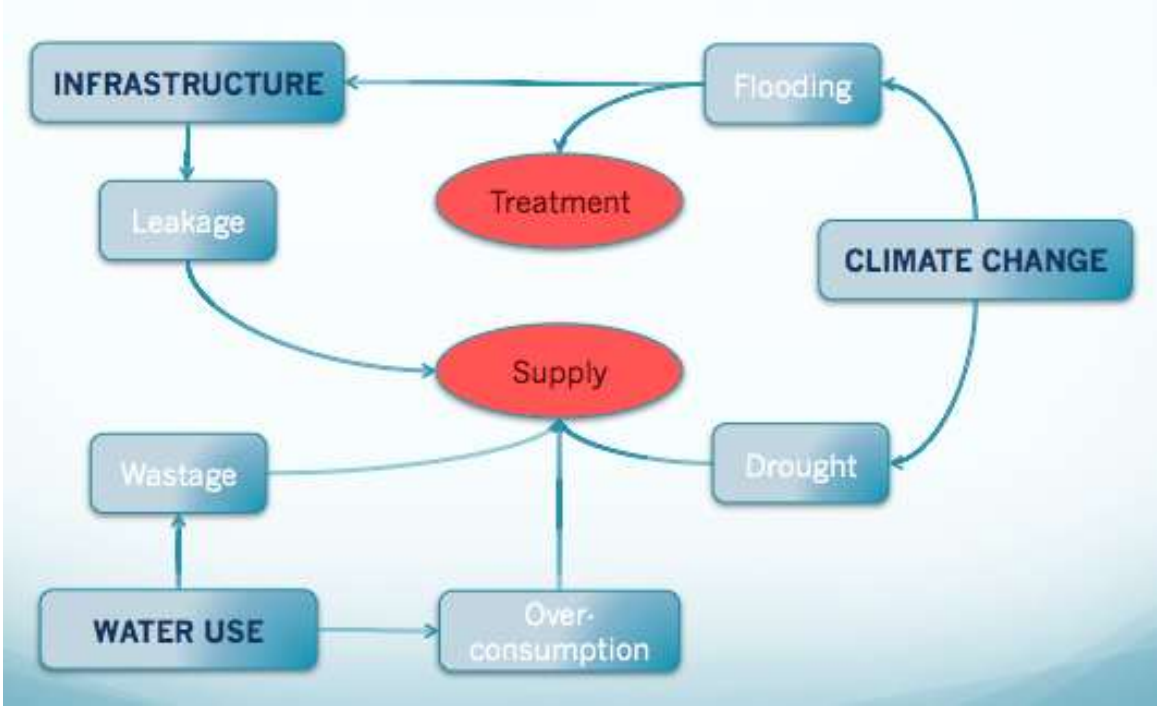
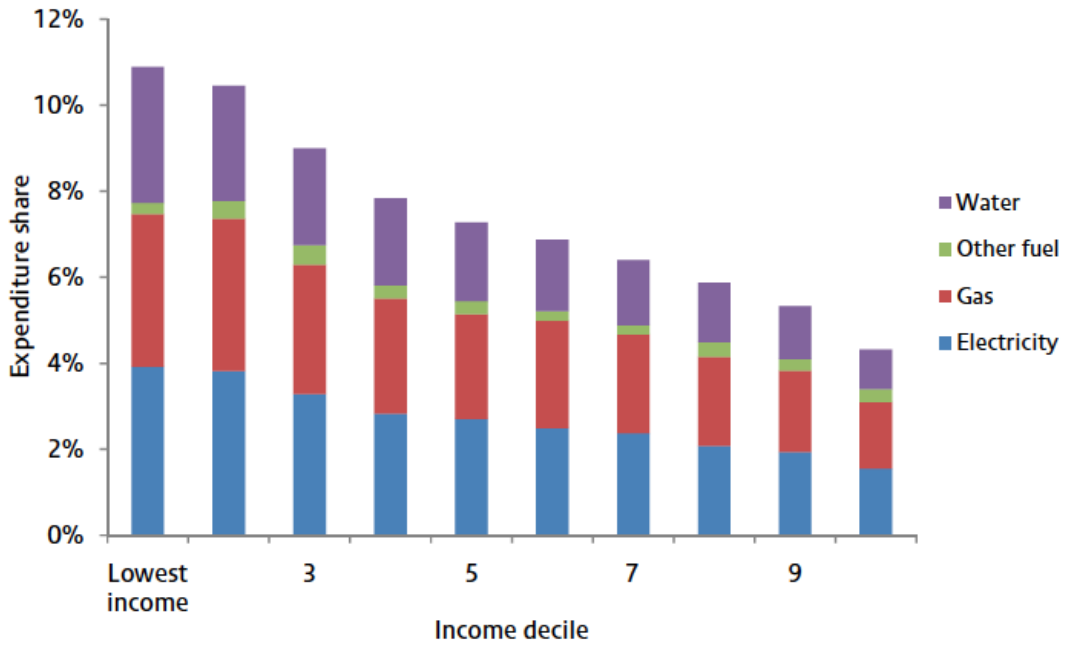


Figure 3 shows that lower income households currently spend proportionately more of their incomes on water so will be hit harder than better off households by rising prices.

Figure 3: Shares of spending on fuel and water in 2009 (Levell & Oldfield 2011)



(Based on ONS Living Costs and Food Survey)

This paper reviews the current state of and future prospects for water poverty in England and Wales, based on the secondary analysis of the Family Resources Survey (FRS) (2009/10).

The FRS is not the only source of data on water bills but as OFWAT (2011a) argued "We assessed several sources of information for our indicator, and concluded that the FRS would be the most appropriate choice. The survey has a large sample size, and includes detailed information on benefits, water bills, metering, water debt, and household demographics. The survey runs every year, so we can also track changes over time. The advisory group agreed that this survey was the most appropriate choice, though they recommended examining other surveys in further work."

There is no official definition of water poverty, or how it should be measured. By convention households have been defined as water poor if they spend more than three per cent of their income on water bills. OFWAT (2011a) discusses the limitations of this definition but acknowledges its usefulness in identifying trends and patterns in water affordability. The Consumer Council for Water (Snell and Bradshaw 2009) and OFWAT also use an additional measure - the percentage of households spending more than five per cent of their income on water bills. The numerator is the household water bill and the denominator is calculated as net household income after housing costs but before water payments. There is a debate about whether the income denominator should be equivalised to take account of household composition. The independent advisory committee to the OFWAT (2011a) review concluded that it should not be. The Hills Review (2011) of fuel poverty, supported equivalisation of income if spend was also adjusted depending on household composition.

The data have been adjusted to the average of 2009/10. The analyses that follow here use these definitions and are based on households that pay for their water services.

Current state of water poverty

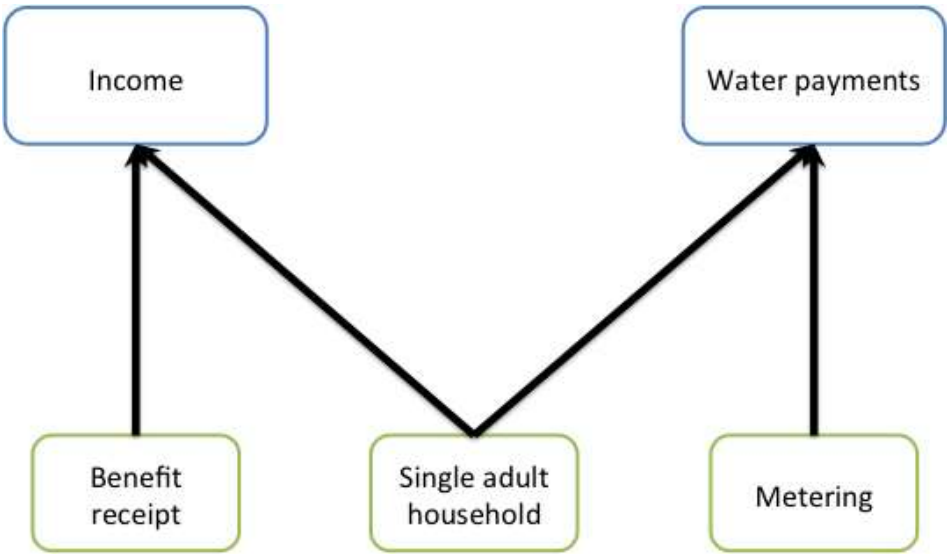
In 2009/10 23.6% of households paying for water in England and Wales were spending more than 3% of their income on water and sewerage and 11.5% were spending more than 5% of their income. We have also estimated an average *water poverty gap* – that is for those spending more than 3% and 5% on water how much their bills need to fall to be lifted out of water poverty. Our best estimate is that the mean gap at the 3% threshold is £3.46 per week (median £2.48) and at the 5% threshold it is a mean of £3.62 (median £2.44).

We know from previous research (Snell and Bradshaw 2009, Huby 1998) that water poverty rates vary with a number of household characteristics. Here we concentrate on three key factors that have significant impacts on water poverty rates on the grounds that they are important and policy relevant:

- Household type
- Benefit status
- Water metering

Of course these three factors interact (Figure 4). We should expect benefit receipt and being in a single person household to have an impact on the income denominator of water poverty, while being in a single person household and having a water meter will have an impact on the numerator water payment when these factors are associated with lower water use.

Figure 4: Interactions between components and determinants of water poverty causing lower water bills



Household type

Table 1 shows that both 3% and 5% water poverty rates vary by the type of household, with single and lone parent households having higher rates than couples and multi-unit households in England and Wales. The table also compares the distribution of households in the FRS in 2009/10 and the CLG distribution for England in 2008. They are very similar.

Table 1: Water poverty rates by household type (England and Wales 2009-10)

Household type	% spending over 3% income on water	% spending over 5% income on water	% of household type in population	% of household type in CLG for England in 2008
One adult only	41.5	23.0	28.7	33.7
One adult with 1 child	46.2	23.2	3.1	3.3
One adult with 2 children	38.8	13.5	2.0	2.1
One adult with 3 or more children	28.6	7.6	0.6	1.0
One family couple with no children	15.2	5.7	30.0	27.0
One family couple with 1 child	15.0	6.7	7.8	5.7
One family couple with 2 children	12.8	6.8	8.2	7.3
One family couple with 3 or more children	10.3	5.5	2.8	3.3
Multi-family household	13.1	5.5	16.7	16.6
Total	23.6	11.5	100.0	100.0

The presence of only one adult in the household has the biggest effect on water poverty so in the rest of the analysis we distinguish between one adult (including lone parent households) and other households (Table 2).

Table 2: Water poverty rates by whether single adult household (England and Wales 2009-10)

Single adult household	% spending over 3% income on water	% spending over 5% income on water	% of households in population
Yes	41.5	22.2	34.5
No	14.1	5.9	65.5
Total (n=1907)	23.6	11.5	100.0

Benefit status

Households dependent on income-tested benefits are defined here as receiving Income Support, Pension Credit, income-based Job Seeker's Allowance or income-related Employment Support Allowance (ESA). They also include Child Tax Credit families (who are not claiming Income Support, income-based Jobseeker's Allowance or Pension Credit) whose equivalised income (excluding housing benefits) is below 60% of the median before housing costs. With the exception of subsistence and accommodation support for asylum seekers, this definition follows the one used in the English Indices of Deprivation 2010 (CLG 2011) and thus would enable us to map the spatial distribution of water poverty.

This gives us the water poverty rates shown in Table 3. There is a much higher rate of water poverty among benefit-dependent households.

Table 3: Water poverty rates by income deprivation (England and Wales 2009-10)

Benefit-dependent	% spending over 3% income on water	% spending over 5% income on water	% of households in population
Yes	46.6	23.1	17.3
No	18.8	9.1	82.7
Total	23.6	11.5	100.0

Water meters

Our analysis of the Family Resources Survey 2009/10 found that 36 per cent of households in England are metered. Table 4 gives the water poverty rates for metered and unmetered households in 2009/10. Water poverty is lower among metered customers. This is at least partly because their bills are significantly ($t=15.9$; $p < 0.001$) lower. The average bill is £6.12 a week for metered households compared to an average of £7.08 for unmetered consumers. There are two types of explanation for metered bills being lower. First having a water meter for existing customers is usually a matter of choice. Households who are likely to have lower bills with a meter than with rates-based charges are more likely to have opted for a meter.

Second households with a meter may be more conscious of how they use water and may reduce their consumption to save costs.

Table 4: Water poverty rates by metering (England and Wales 2009-10)

Metered system for payment	% spending over 3% income on water	% spending over 5% income on water	% of households in population
Yes	17.5	8.6	36.0
No	24.7	11.5	64.0
Total	22.1	10.5	100.0

Modelling the probability of water poverty

The combined effects of household type, benefit dependency and metering are explored using a logistic regression model to predict the probability of households being in water poverty. The best fitting model parameters are shown in Table 5. Predictor variables are all coded (1=Yes; 0=No). Each predictor is significant (Wald $p < 0.0001$).

The odds ratios show that, all else being equal, households with only one adult have odds of water poverty that are almost four times higher than the odds for larger households; those receiving benefits are three times more likely to be water-poor than non-benefit households; and metered households are only half as likely to be water-poor as households charged for water on the basis of rateable values.

Table 5: Logistic regression model to predict water poverty at the 3% threshold (England and Wales 2009-10)

		95% CI for odds ratio		
	B(se)	Lower bound	Odds Ratio	Upper bound
One adult	1.36 (0.04)	3.62	3.91	4.23
Benefit receipt	1.14 (0.05)	2.85	3.12	3.41
Metered water	-0.53 (0.04)	0.54	0.59	0.64
Constant	-1.89			

Cox & Snell $R^2 = 0.12$; Nagelkerke $R^2 = 0.18.1$; Model χ^2 (3) = 2169.3; $p < 0.0001$

The model can be used to estimate the probability of different household types being in water poverty in 2009-10. The model equation is $P(\text{water poverty}) = 1/(1 + e^{-Z})$ where $Z = (-1.89 + 1.36$ (one adult) + 1.14 (benefit receipt) – 0.53 (metered)). Table 6 shows that unmetered, one-adult households in receipt of benefits have the highest probability of being in water poverty (0.67). Larger households not on benefits and paying for water on a metered basis have the lowest probability of being water poor (0.08).

Table 6: Probability of different types of households being in water poverty in England and Wales 2009-10 (n=17225)

Metered water bills	Benefit receipt	One adult in household	% of total households	Probability of water poverty
0	0	0	38.3	0.13
0	0	1	14.1	0.37
0	1	0	6.3	0.32
0	1	1	5.4	0.67
1	0	0	20.6	0.08
1	0	1	10.8	0.26
1	1	0	1.9	0.22
1	1	1	2.7	0.52

Predicting future water poverty in England and Wales

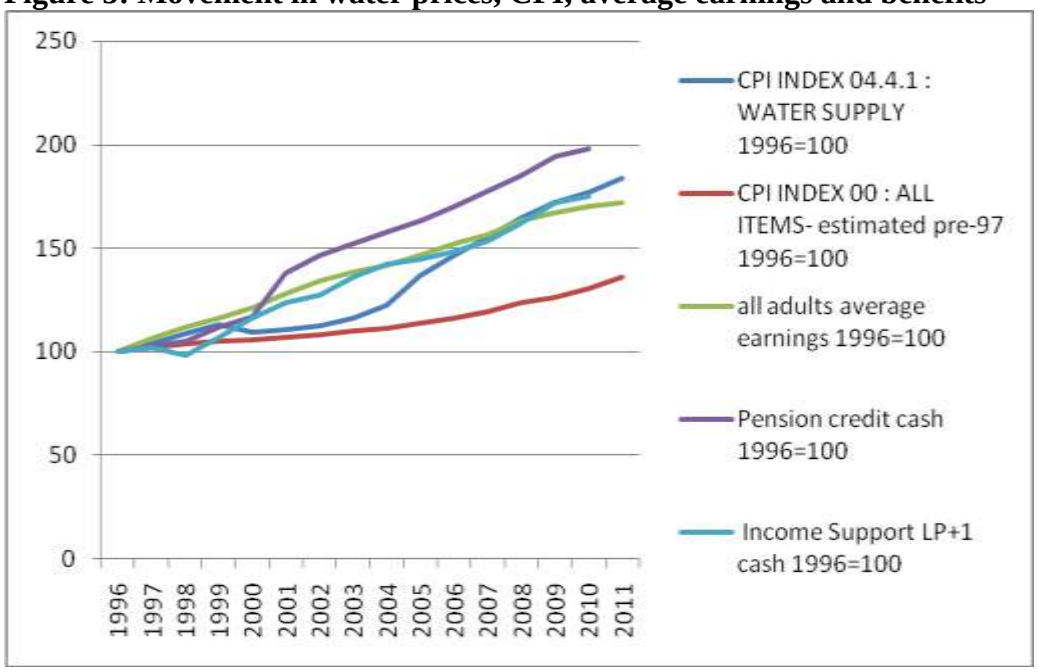
Over the last few years the normal relationship between earnings and prices has changed - prices have been rising faster than earnings and real living standards have been falling. The Office of Budget responsibility (2011) forecasts are that real median household income will be 7 per cent lower in 2012-13 than it was in 2009-10 and remain below its 2009-10 level until 2015-16. The Office of Budget Responsibility (2011) expects CPI inflation to exceed 4 per cent into 2012 and then to begin to fall rapidly to 2 per cent in 2013 and beyond.

However even if unemployment begins to fall and incomes begin to rise, there are a set of global factors that may make the next decade and beyond one of static or falling living standards. These are the substantial increases in the costs of food, fuel and clothing (and possibly water), driven by a long term rise in world demand, increases in the price of raw materials, environmental change and increasing labour costs in China and other emerging economies. These are particularly serious because all these commodities constitute a larger share of the budgets of low income households.

Low income households (with a high risk of water poverty) depend on cash benefits which are currently pegged to the Consumer Prices Index (CPI). The CPI has been increasing ahead of earnings suggesting that recipients of state benefits have actually been protected better than wage earners from falling living standards. But the CPI represents average consumption patterns, not the consumption patterns at the bottom of the distribution. For example Hirsch et al (2011) estimate that between 2000 and 2008 the cost of the minimum income standard basket of goods rose by 38% while the CPI only rose by 23%. The poorest one-fifth of households had faced an average annual inflation rate of 4.3 per cent between 2008 and 2010, whereas the richest one-fifth had experienced a rate of just 2.7 per cent. Pensioners, and in particular those dependent on state benefits, experienced higher rates of inflation than non-pensioners (Levell and Oldfield (2011). Hirsch et al (2011) have suggested a scenario where the minimum costs of living could rise by 34 per cent by 2020 and by between 9 and 18 per cent after adjusting for general inflation. If this happens, the real incomes of in-work and out-of-work households dependent on cash benefits and tax credits will continue to fall. Indeed unless earnings grow, average living standards will also fall.

Turning to focus on water, we have already seen that prices since privatisation have increased at a faster rate than overall prices and earnings. If this continues, even if the CPI uprating of benefits continues, water charges are going to place an increased burden on low income households. Figure 5 shows the relationship between water prices, earnings, CPI inflation and benefit levels for two key benefits in two types of family: Income Support for a lone parent plus one school aged child and Pension Credit for a single pensioner. Again over this period water prices have risen much faster than the overall CPI and since 2008 they have again overtaken average earnings. Pension Credit has actually increased faster than earnings, prices and water prices over this period as a result of efforts after 2001 to reduce pensioner poverty. Income Support for lone parents was being increased in line with the RPI (Rossi Index) but since 2011 is now increased by the CPI, and is just beginning to fall behind in comparison with water prices. If water prices go on rising faster than the CPI and there is no change to the formula for uprating benefits this situation is likely to continue.

Figure 5: Movement in water prices, CPI, average earnings and benefits



The rate of water poverty is a function of the size of the water bill and the income of the household. So in order to predict what is going to happen to water poverty in the future we need to predict what is going to happen to the level of water bills and to household incomes over the next 20 or so years. In almost any period in the last 60 years it would have been difficult to do this successfully, but at this time it is particularly challenging.

According to OFWAT (2012), water bills are forecast to rise by an average of 5.7 per cent in 2012, 0.5 per cent above inflation. OFWAT has suggested that before inflation "average bills would remain broadly stable between 2010 -15". We do not know what is going to happen after that. Clearly the relationship between water charges and incomes can be very complex and may well differ for consumers with different sources of income.

We decided to model a range of simple scenarios of the possible relationship between bills and income between 2009-10 and 2033. They are:

1. Water bills will fall by 1% per year faster than average household income
2. Water bills will rise by 0% per year faster than average household income

3. Water bills will rise by 1% per year faster than average household income
4. Water bills will rise by 2% per year faster than average household income
5. Water bills will rise by 3% per year faster than average household income

The results for water poverty in 2033 are shown in Table 7. If there were no increase in water bills from 2009-10 levels then the water poverty rate would remain at 23.6 per cent using the 3% water poverty threshold and 11.5 per cent using the 5% threshold. If water bills increased by 3 per cent per year more than income then by 2033 the water poverty rate would affect more than half of all households (53.7%) at the 3% threshold and nearly a third (30.0%) at the 5% threshold. **This is holding all other factors constant.**

Table 7: Water poverty rates in 2033 given various year on year changes in bills relative to income from 2010. Percentage of households spending more than the threshold of income on water bills: England and Wales

Water poverty threshold (% of income spent on water)	Water bills rise faster than average income by:				
	-1% pa	**0% pa**	**1% pa**	**2% pa**	**3% pa**
3% threshold	17.2	23.6	32.4	42.3	53.7
5% threshold	8.5	11.5	16.1	21.9	30.0

Future changes in household structure and metering

Table 2 has shown that an important factor associated with water poverty is household structure. The Department of Communities and Local Government publish Household Projections for England from 1991 to 2033. These predict changes in the distribution of households with much of the growth coming in single person and lone parent households. The percentage of single adult households in England is projected to rise from 40.1 in 2008 to 49.2 in 2033. There will be a decline in the number of larger complex households. These changes in household size will increase the water poverty rate, given single person households have a higher rate of water poverty. However they will interact with changes in water metering.

All water companies have plans to increase the proportion of households with water meters and a study by OFWAT (2011b) found that faster rates of metering in England and Wales could be "significantly beneficial for customers and the environment" under certain conditions. In 2011, 38 per cent of customers were metered, slightly more than the FRS 2009-10 estimate of 36 per cent. As we have seen metered households on average paid significantly less for their water than unmetered households. But metering in itself does not reduce bills. Even if metered households reduced their consumption, the extent to which their bills would decrease depends on the charging tariffs in place and how these compare to local charges based on rateable values. In general, households with low usage and high rateable values would have lower water bills if they paid on a metered basis. Larger families with higher usage would seem to be less likely to benefit from a switch. But although we know how much unmetered households pay now in rates-based water bills we do not know how much those same households would pay if their bills were metered.

Part of the variation in the bills of metered and unmetered consumers is due to differences in their characteristics and behaviour. One-adult households in England and Wales in 2009-10 were more likely to have a water meter (41.0%) than larger households (33.5%). OFWAT (2011b) reports that customers living on their own were more likely to have asked for a water meter, suggesting those who opted to switch to meters did so to save money. However, metered households are not necessarily less likely to be poor than other types. While 12.6 per cent of metered households in England and Wales were in receipt of means-tested benefits in 2009-10, so were 18.2 per cent of non-metered households.

Implications for policy
What could be done to mitigate water poverty and the expected increase in water poverty?

Metering: extending metering can be expected to reduce bills. The majority of unmetered households are single adult households, which might be expected to use less water than their rateable value based bills has them paying for. Also there is evidence that households reduce their consumption after having a meter installed. Single adult households are also at higher risk of water poverty. An offsetting factor however is that those already metered are more likely to be those whom would save as a result of having a meter and the consumers still to be metered are likely to be larger consumers with higher bills. However they are also less likely to be at risk of water poverty. Of course extending metering will cost the water companies– from lost revenue of reduced charges/consumption and the costs of installing and reading meters.

Tariffs: Water tariffs are regressive due to the standing charge. Small consumers pay more per unit. Standing charges are justified by arguments about fixed costs and the need for charges to reflect marginal economic costs. We are not convinced by these arguments. Social and environmental arguments would support the abolition of standing charges. Indeed it might mitigate water poverty if there were lower charges for the first x% of water consumed each quarter. It may be that seasonal tariffs might have an impact on water poverty with higher charges in the summer months to deter "unnecessary consumption" for example gardens and swimming pools. But the water poor are less likely to use water in this way. The CC Water study (Snell and Bradshaw 2009) discussed the feasibility of more direct social tariffs. Could water companies cross-subsidise water poor consumers, or might government provide resources to enable water companies to reduce the charges for water poor customers? The Government has just announced a Treasury funded £50 per household water rebate for the customers of South West Water from April 2013. But this is really rather surprising - neither the companies nor the government would be keen to extend social tariffs. Companies would argue that it is not their responsibility. Government would argue that they already provide support through the benefit system and water charges are taken into account in the level of that support though they are not fully with CPI uprating. Water Sure is a limited exception which restricts bills to the average for the region for people on income tested benefits who have three or more children or a medical condition. The Water White Paper (DEFRA 2011) allows water companies to be given discretion to extend such schemes. The issue remains – how is any help to be targeted – how are the water poor to be identified? The water companies have information on water charges but not household income. We modelled a number of methods for identifying the water poor by, for example, using household size, age, benefit receipt, and found none of them were very successful – they excluded substantial proportions of water poor households and included substantial proportions of households who are not water poor. We have seen above that if help was targeted on

- Benefit recipients it would exclude 60% of the water poor and include 15% who are not water poor.
- Single adult households it would exclude 36% of the water poor and include 37% who are not water poor.
- Pensioner households it would exclude 69% of the water poor and include 75% who are not water poor.

Using less: The White Paper (DEFRA 2011) has suggested that we should aim to reduce water consumption to 130 litres per head by 2030. Universal metering would be a first step to getting people to recognise the value of water and water services (Huby 1995). But thereafter we run into the same problems that exist in the energy sector. Better off consumers are least likely to be deterred by small price rises, especially if they have no environmental concerns, and they are the ones most likely to use drinking water to wash cars. In an ideal world (Hills et al 1997) we would provide a tranche of clean water free of charge, the next tranche would be charged at a basic rate and then we would charge a really high tariff for water use above a certain level. The problem of course is how to establish the cut-off points.

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